MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2015/2016

PMT0075 – ALGEBRA

(All sections / Groups)

3 JUNE 2016
3.00 pm – 5.00 pm
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **THREE (3)** printed pages including the cover page with 4 questions only.
2. Answer all **FOUR (4)** questions
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculators are allowed.

Question 1 (25 Marks)

a) Given U = universal set = $\{0,1,2,3,4,5,6,7,8,9\}$, $A = \{1,2,3,5,8\}, B = \{2,3,5,7\}$ and $C = \{1,4,9\}$. Find

i. $\overline{A \cup B}$

ii. $(A \cap B) \cup C$

iii. $(B \cup C) \cap A$

(6 marks)

b) Perform the indicated operations and simplify the result.

i. $\dfrac{5x+6}{x+1} + \dfrac{7x-3}{9x}$ **(5 marks)**

ii. $\dfrac{2x-2}{x} \cdot \dfrac{8x^2}{6x-6}$ **(4 marks)**

iii. $\dfrac{\frac{5}{7} + \frac{3}{x}}{\frac{2}{x} + 1}$ **(6 marks)**

c) Simplify the expression. Express the answer so that all exponents are positive.

$$\left(\frac{-2x^{1/3}y^{1/2}}{3z^{-5}}\right)^{-2}$$ **(4 marks)**

Question 2 (25 Marks)

a) Solve the equation.

i. $x(2x-1) = (2x+1)(x-2)$ **(3 marks)**

ii. $\dfrac{x-2}{x-5} = \dfrac{x+6}{x-7}$ **(4 marks)**

iii. $|2x+3| + 3 = 7$ **(5 marks)**

b) Solve the quadratic equation by using given method.

i. $x^2 - 11x + 30 = 0$ (factoring) **(2 marks)**

ii. $x^2 + 5x - 5 = 0$ (completing the square) **(4 marks)**

c) Solve the inequality. Express the answer in interval notation.

i. $18 \le 5x - 2 \le 28$ **(3 marks)**

ii. $0 < \dfrac{2x+5}{2} < 3$ **(4 marks)**

Continued...

Question 3 (25 Marks)

a) Given $f(x) = -4x + 9$ and $g(x) = 5x + 9$. Find

i. $(f \circ g)(x)$

ii. $(g \circ f)(x)$ **(6 marks)**

b) Graph the function using the techniques of transformations. Start with the graph of the basic function and show all the stages.

$$f(x) = (x + 1)^2 - 4$$ **(6 marks)**

c) Solve the equation.

i. $\log_4(x + 1) + \log_4(x - 5) = 2$ **(7 marks)**

ii. $2 + \log_3(2x + 5) - \log_3 x = 4$ **(6 marks)**

Question 4 (25 Marks)

a) Find the sum of the sequence

$$\sum_{k=1}^{28} (-3k - 4)$$ **(6 marks)**

b) Find the 8^{th} term and sum the terms for the following geometric sequence.

$$-1, 3, -9, \ldots$$ **(7 marks)**

c) Show that the following statement is true for all natural numbers n. **(6 marks)**

$$6 + 12 + 18 + \ldots + 6n = 3n(n + 1)$$

d) Expand the expression using the Binomial Theorem.

$$(4x - 1)^4$$ **(6 marks)**

End of Page.